

REMARKS

In the amendments above, Claims 9 and 12 have been amended to more particularly point out and distinctly claim Applicant's invention.

Claims 1-19 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Itakura. U.S. Patent No. 6,278,873 ("Itakura") in view of Bolanos., U.S. Patent No. 5,926,144 ("Bolanos") and Kita., U.S. Patent No. 6,825,751 ("Kita"). The Examiner maintains that with regard to Claim 1, Itakura discloses a wearable device comprising:

one or more circuit substrates comprising electrically conductive parts being disposed in at least a first plane;

a radio unit operating at a radio frequency; and

a loop antenna coupled to the radio unit, the loop antenna comprising a conductor formed into a loop defining an area and being disposed in a second plane,

wherein the electrically conductive parts of at least one of said one or more circuit substrates substantially act as a ground plane causing a ground plane effect for the loop antenna and such that at least the electrically conductive parts of said at least one circuit substrate are within said area defined by the loop when observed in plan view minimizing the ground plane effect of the electrically conductive parts of said at least one circuit substrate on the loop antenna;

that Itakura doesn't expressly teach that the loop antenna consisting of a single loop formed and wherein said first plane is substantially coplanar with said plane; that Bolanos teaches that that the loop antenna comprises a single loop formed; that it would have been obvious to one ordinary skill in the art at the time the invention was made to combine the teaching of Bolanos with Itakura's device such that the wearable electronic device would be made much thinner; that Kita teaches said first plane is substantially coplanar with said second plane; and that it would have been obvious to one ordinary skill in the art at the time the invention was made to combine the teaching of Kita with Itakura's device such that a magnetic flux path in which a magnetic flux passes a side section on the lower face side from the upper face of the case is ensured during data transmission/reception.

The Examiner also maintains that with regard to Claim 2, Itakura further discloses the radio unit is mounted on one of said one or more circuit substrates; that with regard to Claim 3, Itakura further discloses that said at least one circuit substrate is positioned entirely within the area defined by the loop, when said at least one circuit substrate and the loop are observed perpendicularly with respect to the second plane; that with regard to Claim 4, Itakura further discloses that the loop antenna is formed on the periphery of said at least one circuit substrate; that with regard to Claims 5 -7, Itakura further discloses that the loop antenna is coupled to the radio unit via balancing means which comprises a balancing transformer and [conduct] between the radio unit and antenna; that with regard to Claim 8, Bolanos discloses that at least 1.8 mm ($\geq 1.8\text{mm}$) is needed between two planes at an operating frequency of 930 MHz; that the wavelength of 930 MHz is about 3 cm; that based on Applicant's claim, the maximum vertical distance should be 3mm at an operating frequency of 930 MHz; that it is within the range of at least 1.8 mm in which is asserted by Bolanos and the distance between the two planes is adjustable according to the manufacture; that with regard to Claim 13, Itakura further discloses at least one circuit substrate is a printed circuited board; that with regard to Claim 14, Itakura further discloses that the radio unit comprises a radio receiver and/or a radio transmitter; that

with regard to Claim 16, Itakura further discloses the wearable device comprises a display unit; and that with regard to Claims 17 and 18, Itakura further discloses the wearable device comprises a watch circuit with computer function.

The Examiner further maintains that Bolanos discloses that at least 1.8 mm ($>$ or $=$ 1.8mm) is needed between two planes at an operating frequency of 930 MHz; that the wavelength of 930 MHz is about 3 cm; that based on Applicant's claim, the maximum vertical distance should be 3mm at an operating frequency of 930 MHz; that it is within the range of at least 1.8 mm in which is asserted by Bolanos and the distance between the two planes is adjustable according to the manufacture; and that it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching Bolanos with Itakura such that a suitable distance between the planes is set to maximize the effect of antenna.

The Examiner further maintains that with regard to Claim 9, Bolanos further discloses the loop antenna is coupled to radio unit via a balancing mean at two separate points located substantially 45-180° apart from each other on the conductor loop of the loop antenna with respect to the center of the conductor loop in order to enable the use of circular polarization; that with Claims 10 and 11, Itakura further discloses that the loop antenna is coupled to the radio unit via balancing means in which comprises a balancing transformer and conduct between the radio unit and antenna; that with regard to Claim 12, Itakura doesn't disclose the detail about the length of the conductor of the loop antenna [being] substantially equal to a wavelength corresponding to the radio frequency that the radio unit operates at; that Asano discloses that the length of the conductor of the loop antenna is substantially equal to a wavelength corresponding to the radio frequency that the radio unit operates at; that it would have been obvious to one ordinary skill in the art at the time the invention was made to combine the teaching of Asano with Itakura's

device such that the effective antenna is maximized; that with regard to Claim 15, Itakura doesn't disclose the radio unit comprises a GPS receiver; that the Examiner takes "Official Notice" that is notoriously well known in the art to utilize a GPS receiver in order to assist the user to locate the present location; that, therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a GPS receiver to assist the user to locate the present location; that with regard to Claim 19, Itakura doesn't disclose the wearable device comprise a wristwatch housing of electrically non-conducting material; that the Examiner takes "Official Notice" that is notoriously well-known in the art to have non-conducting material for a wristwatch housing in order to resist water or reduce interference with a radio unit; and that it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the non-electrical conducting material with Itakura's device such as plastic material to resist water and reduce interference with the radio unit within the housing.

Applicant respectfully traverses the above rejection.

The Examiner has correctly noted that Itakura fails to teach, e.g., "the loop antenna consisting of a single loop formed of a conductor..." and "...wherein said first plane is substantially coplanar with said second plane...." However, the Examiner claims that Bolanos and Kita teach these essential features of Claim 1 of the present application and that it would have been obvious to combine the teachings of Itakura, Bolanos, and Kita. This is not the case, as will be discussed below:

With regard to the combination of the teachings of Itakura and Bolanos, it should be noted that in Bolanos the loop of the loop-shaped antenna comprising conductor portions 418, 420, 422 and 416 (see Figs. 4 and 7) extends vertically, i.e., is perpendicular to the plane of the circuit board 406. Now, if the antenna described in

Bolanos was implemented in the device of Itakura, it would be similarly perpendicular to the circuit boards 14 and 15 of the device of Itakura.

In the Office Action, the Examiner has argued that "it would have been obvious ... to combine the teachings of Bolanos with Itakura's device such that the wearable electronic device would be made much thinner...." However, as explained above, if the antenna of Bolanos was used in the device of Itakura, the device would not become any thinner because the antenna of Bolanos is perpendicular to the circuit boards, i.e., it would have a substantial dimension in the vertical direction. Thus, the antenna of Bolanos would actually substantially add to the thickness of the Itakura's device. As a result, a person skilled in the art would not have the alleged motivation to combine the teachings of Itakura and Bolanos.

With regard to the combination of the teachings of Itakura and Kita, it should be noted that the antenna in Kita is a coil antenna which always comprises at least some turns or some tens of turns ("some" generally understood to mean at least three); for example, see Column 7, line 40; Column 13, lines 47-48, 52-53, and 58-61. Thus, Kita does not disclose a loop antenna.

It should also be noted that if the coil antenna of Kita would be applied to Itakura's device, it would necessarily comprise more than one loop as Kita specifically teaches that the coil antenna comprises "at least some turns." Such a combination would not correspond to the present invention as claimed.

Moreover, because Kita fails to disclose anything about loop antennas, it cannot be considered obvious that a person skilled in the art would even consider combining the

teachings of Kita relating to the coil antenna to the devices of Itakura (or Bolanos) which use a loop antenna since a coil antenna is not equivalent to, and thus not necessarily interchangeable with, a loop antenna. In particular, Kita teaches that the antenna coil described therein is such that it transmits and receives signal by means of electromagnetic induction (Column 13, lines 33-34), i.e., a magnetic flux coupling the antenna coil to another coil for transmission between them. This kind of antenna coil utilizing the electromagnetic induction method, as explained by Kita (Column 1, lines 36-50), is able to receive data only over a distance of some tens of centimetres. The device of Itakura, on the other hand, is intended to be used in a radio-paging receiver (Column 1, lines 10-14) which typically must be able to receive signal over distances of at least several tens or hundreds of meters. A person skilled in the art would readily know that the antenna coil of Kita using the electromagnetic induction method and having a range of some tens of centimetres would not be suitable to be used in the radio-paging receiver of Itakura and would not combine Kita and Itakura.

Finally, Itakura specifically teaches away from using coil antennas by stating that a device with a coil antenna "has a problem of poor receiving sensitivity and degraded communication device performance ..."; see, Column 1, lines 33-38, of Itakura. Thus, a person skilled in the art, after consulting Itakura, would know that coil antennas are inferior and would therefore not use any of the teachings of Kita, which only relate to the use of a coil antenna.

As a result, a person skilled in the art would not combine the teachings of Itakura and Kita either.

In sum, a person skilled in the art would not combine the teachings of Itakura, Bolanos, and Kita. Moreover, even if the teachings of Itakura, Bolanos and Kita were

combined, the result would still not correspond to the presently claimed invention. Since the combination of Itakura, Bolanos, and Kita does not disclose or suggest all the limitations of Claim 1, it does not render Claim 1 obvious. Claims 2 to 19, which depend directly or indirectly from Claim 1 and add further features thereto are not obvious for at least the reasons discussed with respect to Claim 1. Accordingly, the rejections under 35 U.S.C. §103(a) of Claims 1 to 19 should be withdrawn and Claims 1 to 19 should be allowed.

Should the claims herein be allowable but for minor matters that could be the subject of an Examiner's Amendment or a supplemental submission by Applicant, Applicant would appreciate the Examiner's contacting Applicant's undersigned attorney.

Reconsideration and allowance of all the claims herein are respectfully requested.

Respectfully submitted,



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